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Ontario Motor Vehicle Accidents - An Economic Appraisal

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ONTARIO MOTOR VEHICLE
ACCIDENTS - AN ECONOMIC APPRAISAL

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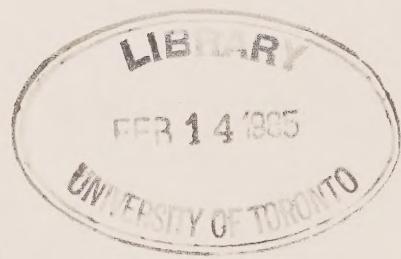
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CONTENTS

| | Page |
|--|------|
| PREFACE | iv |
| 1/ INTRODUCTION | 1 |
| 1.1/ Accident Statistics | 1 |
| 2/ ECONOMIC APPRAISAL | 2 |
| 2.1/ Introduction | 2 |
| 2.2/ The Costs Associated with Motor Vehicle Accidents | 2 |
| 2.2.1/ Property Damage | 2 |
| 2.2.2/ Health Care | 3 |
| 2.2.3/ Production Losses | 5 |
| 2.2.4/ Funeral Cost | 6 |
| 2.2.5/ Insurance Operating Expenses | 7 |
| 2.2.6/ Legal and Court Fees | 7 |
| 2.2.7/ Accident Investigation | 7 |
| 2.2.8/ Cost to Friends and Relatives | 8 |
| 3/ PROVINCIAL ESTIMATE OF TOTAL ECONOMIC COSTS | 9 |
| 4/ REFERENCES | 10 |



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LIST OF TABLES

| | PAGE |
|---|------|
| 1/ Motor Vehicle Accident Facts | 1 |
| 2/ Average Expenditures Per Victim Who Incurred Respective Component Cost | 3 |
| 3/ Average Cost of Active Treatment by Injury Location. | 4 |
| 4/ Average Cost of Active Treatment by Severity | 5 |
| 5/ Accident Investigation Costs | 7 |
| 6/ Ontario Estimate of Motor Vehicle Accident Economic Cost (1980) | 9 |

PREFACE

The following report is an outgrowth of an R&D Branch working paper "Accident Cost Determination - Status on Current Figures," 1979, by Thomas Evans (Waterloo Co-operative Student). It includes data from the MTC/MOH survey of hospitalized motor vehicle accident (MVA) victims¹.

The findings are presented by cost group. Because of differences in break downs in the data, it was not possible to make cost estimates by type of accident. Also, injured victim data includes only those treated at a hospital immediately following the accident; consequently, the figures underestimate the total costs.

Richard Slocum

August, 1981

¹ This survey is reported in two special reports on the social, personal, and economic ~~costs~~ of personal injury accidents. They are:

• INJURY -- An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims, report number SP-002 (Summary). Research and Development Branch, Ontario Ministry of Transportation and Communications, Downsview, Ontario.

• op. cit., report number SP-003 (Technical Report).

"costs" -

1/ INTRODUCTION

1.1/ Accident Statistics

The Ministry gathers numerous accident statistics which provide a perspective on the extent of the problem (see Table 1). This report will supplement this information from an economic viewpoint.

Table 1/ Motor Vehicle Accident Facts

| | 1980 |
|------------------------------|----------------|
| Total Reportable MVA* | 196 501 |
| Property Damage Only | 127 814 |
| Personal Injury Accidents | 67 391 |
| Fatal Accidents | 1 296 |
| Persons Injured | 101 367 |
| Persons Killed | 1 508 |
| Motor Vehicles Registered | 4 758 010 |
| Vehicle-Kilometres Travelled | 72 419 000 000 |
| Ontario Population | 8 570 000 |
| Drivers Licensed | 4 993 531 |

* "Reportable" limited to accidents in which damages were in excess of \$400 or an injury or fatality was sustained.

Source: 1980 Ontario Motor Vehicle Accident Facts, MTC, 1981, p. 3.

2/ ECONOMIC APPRAISAL

2.1/ Introduction

Economics is the study of resource allocation in the production of goods and services to meet people's needs and wants. In appraising a motor vehicle accident (MVA), an economist can estimate the effect on resource allocation. In other words, what has changed as a result of the accident? Are economic resources being used differently? If the answer is yes, then society has paid an "opportunity cost". Opportunity cost is the production/output that must be foregone because we have decided to use these resources somewhere else. The "somewhere else" in this case is the allocation of resources to the after-effects of an accident. For example, money is spent for extra hospital beds, rather than spending it on a new day-care centre.

In other words, if society has accidents, our standard of living will be lower since we have limited resources.

The appraisal that follows attempts to quantify that loss in dollar terms. Clearly, there are costs from accidents that go beyond pure economics, (for example, pain, disability, emotional stress). Some of these personal impacts have been investigated in Injury: An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims, MTC, 1981 [1]. The present report focuses on economic costs only.

2.2/ The Costs Associated with Motor Vehicle Accidents

2.2.1/ Property Damage

A reportable accident is defined as an accident which has damaged at least \$400 worth of property. "Property" includes vehicles, contents, buildings, structures (bridges/guardrails/lamps and poles, etc.) and even the road itself. Damaged property will require resources to either repair it or replace it; hence, the loss of real wealth to society.

According to police report records the total estimated property damage in 1980 was \$357 640 284. Dividing this figure by the number of reported MVAs, the average cost equals \$1820.

2.2.2/ Health Care Costs

Where injury is incurred by the driver, passenger, or pedestrian, medical care may be required. Health care includes: emergency services such as ambulance and hospital emergency department service; hospital beds and use of specialized equipment; nursing services; medical doctor treatment; and specialized post-hospital care such as physiotherapy, psychotherapy, or nursing home care.

The following average cost figures (Table 2) were taken from a 1978 Ontario government study of motor vehicle accident injury health care costs. Unfortunately, they apply only to those injury victims who went to hospital shortly after their accident.

**Table 2/ Average Expenditures per Victim Who
Incurred Respective Component Cost**

| | <u>1976 (at 1975 Rates)</u> |
|----------------------------------|-----------------------------|
| Hospital Care (In-Patient) | \$1 515.03 |
| Emergency Dept. (Out-Patient) | 18.10 |
| Therapy Treatment | 58.15 |
| Medical Fees | 59.55 |

Source: Changes in the Number and Cost of Motor Vehicle Injury Victims in Ontario. MOH/MTC, 1978, P. 27.

Location of the injury can affect the cost, as seen in Table 3.

Table 3/ Average Cost of Active Treatment By Injury Location

| | <u>1976 (at 1975 Rates)</u> |
|--------------------------------------|-----------------------------|
| General, External/ Multiple Areas | \$ 168.00 |
| Head | 261.00 |
| Neck and Cervical Spine | 243.00 |
| Chest and Thoracic Spine | 473.00 |
| Abdomen and Lumbar Spine | 1 438.00 |
| Pelvic Girdle | 1 067.00 |
| Extremities | 511.00 |
| Mind (Psychological) | 79.00 |
| Back | 114.00 |
| Not Classified | 74.00 |

Source: Changes in the Number and Cost of Motor Vehicle Injury Victims in Ontario. MOH/MTC, 1978, p. 40.

As one would expect, the average health care cost does vary directly with the degree of the injury, as shown in Table 4.

Table 4/ Average Cost of Active Treatment By Injury Severity

| Severity of Injury | 1976 (at 1975 Rates) |
|---------------------------------|----------------------|
| Minor | \$ 58.00 |
| Moderate | 1 113.00 |
| Severe (not life-threatening) | 2 297.00 |
| Serious (life-threatening) | 4 027.00 |
| Critical (survival-threatening) | 4 924.00 |
| Maximum (untreatable) | 1 532.00 |
| Unknown | 128.00 |

Source: Changes in the Number and Cost of Motor Vehicle Injury Victims in Ontario. MOH/MTC, 1978.

The total cost averaged over all hospitalized victims was \$361. By applying an inflation factor of 65% (1975-1980) to this figure, the 1980 average active treatment cost would be \$596. This figure would be only nominally higher if ambulance costs and costs for extended disability treatment are added in.

2.2.3/ Production Losses

Where a productive member of the community is involved in an accident, there may be a temporary or permanent loss of productive output. There may also be a loss of income to the worker and his family.

The dollar value of these losses will vary considerably depending on his/her employment circumstances. For example, there may be an unemployed person who could step into his/her job with little or no loss in production, or it could take weeks or months to replace a key scientist on a complex research project.

A simplifying assumption can be made, however, that there is an economic loss equal to the wages multiplied by the days of work lost for injured workers. It is arbitrarily assumed that there is no measurable economic loss incurred from a fatality, although the personal loss may be great. A further arbitrary assumption made is that housewives are considered to have an economic value equal to the average female wage. Wage loss is taken as a function of average days of work/housework missed and the wage rate.

The recent Injury Study found that taken as a percentage of total hospitalized injured victims (whether they missed work or not), the average number of days of work missed is 15.7 and of housework 14.4 [1]. Average weekly wages and salaries taken from Statistics Canada for Ontario (1980) were \$309 [2], and average female wages and salaries were \$202 [3]. Hence, the average economic value placed on lost production due to injury is:

$$15.7 \times \$309 \div 5 = \$970 \text{ per injured male victim (59%)}$$

and

$$14.4 \times \$202 \div 5 = \$582 \text{ per injured female victim (41%)} \\ \text{or, \$811 per hospitalized injured victim.}$$

2.2.4/ Funeral Cost

Although we have made the arbitrary assumption that a fatality results in no measurable production loss, there is an advancing of the time of a funeral and its cost. Here the economist uses the concept of "present value" based on the time value of money; i.e., that money has a different value today than, for example, in the year 2010. Therefore, future dollar values are "discounted" by an interest-type rate to their present values.

However, since the average number of years to expected natural death is so large, (32 to 42 years), the present value of a future funeral cost is virtually nil.

Hence, the average current funeral cost (\$1650) [1] is the economic value of resource cost.

2.2.5/ Insurance Operating Expenses

This is one of the chief resource costs associated with accidents. Included in the costs are internal legal costs, adjuster and appraisal costs, direct administration, and allocated general administration. These costs may be insensitive to marginal changes in accidents.

For 1980, the ratio of operating expense to premiums earned was 22.0% [4]. Since insurance costs are allocated on a claim basis rather than a victim or accident basis, we can only report the provincial total. Total actual premiums earned in Ontario for 1980 were \$1.2 billion [4]; hence, the total motor vehicle insurance operating cost was \$264 million. Dividing this figure by the total number of MVAs yields an average cost of \$1340.

2.2.6/ Legal and Court Fees

It has been difficult to obtain data on legal and court fees; however, the recent survey of injured victims has provided some insight into these costs. When averaged across all injured victims (whether or not they had legal/court costs), the average legal/court cost was \$145.00 (in 1975 to 1979 dollars). This would be approximately \$175.00 in 1980 dollars. By not including the legal costs associated with property-damage-only and fatality accidents, these costs are understated.

2.2.7/ Accident Investigation

This cost includes police investigation and, in the case of a fatality, coroner (and inquest) costs as summarized in Table 5.

Table 5/ Accident Investigation Costs

| Accident Type | Person-Hours | Dollar Cost |
|---------------|--------------|-------------|
| P.D.O. | 2.0 | \$ 24.00 |
| Injury | 2.9 | 35.00 |
| Fatality | 18.6 | 223.00 |

Source: Ontario Provincial Police, Activity Summary Disposition. Quarterly Report, July - September, 1978. The above figures have been adjusted to 1980 values.

2.2.8/ Cost to Friends and Relatives

A common personal cost is that incurred by concerned friends and relatives. These costs include taking time off work, transportation, flowers, etc. When averaged over all injury accident victims, the dollar amount is nominal [5].

3/ Provincial Estimate of Total Economic Costs

Table 6 synthesizes the accident facts from Table 1 and the various economic costs from the body of the report. The total for 1980 approaches three-quarters of a billion dollars.

Table 6/ ONTARIO ESTIMATE
OF MOTOR VEHICLE ACCIDENT
ECONOMIC COSTS (1980)

| | | |
|--------------------------|--|-----------------|
| Property Damage Costs | | \$357 640 284 |
| Health Care Costs | (101 367 x 55%* x \$596) | = \$ 33 228 102 |
| Lost Production | (101 367 x 55% x \$811) | = \$ 45 214 750 |
| Funeral Costs | (1 508 x \$1 650) | = \$ 2 488 200 |
| Insurance Operating Cost | | \$264 000 000 |
| Legal and Court Fees | (101 367 x 55% x \$175) | = \$ 9 756 574 |
| Accident Investigation | (127 814 x \$24) +(67 391 x \$35) +(1 296 x \$223) | = \$ 5 715 229 |
| Total | | \$718 043 139 |

This 55% adjustment represents "hospitalized" victims. No cost estimate is offered for the remaining 45% of injured victims; hence, total costs are understated. This helps to explain why insurance operating costs only appear to represent such a large share of total costs.

4/ REFERENCES

- [1] Injury: An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims. MTC, 1981, p. 127.
- [2] Statistics Canada, 11-003E, Canadian Statistical Review. May, 1981.
- [3] Statistic Canada, 13-207, Income Distribution by Size in Canada. 1979.
- [4] Automobile Insurance Experience for All Provinces in Canada. Insurance Bureau of Canada, 1980.
- [5] Injury: An Ontario Survey of the Societal and Personal Costs of Hospitalized Motor Vehicle Accident Victims. MTC, 1981, p. 25.

